

REMARKS

The Examiner rejected claims 1, 19, and 21 under 35 U.S.C. Section 103(a) as being unpatentable over Asao et al. US 2003/0107538 in view of Zhang et al., U.S. Patent No. 5,461,397.

Asao et al. disclose a display device that includes a plurality of pixels and a control means for effecting a plurality of displaying operations at each pixel. Each of the displaying operations includes at least a first operation for displaying a first image at a first luminance and a subsequent second operation for displaying a second image substantially identical to the first image at a second luminance.

In particular, with reference to FIG. 19 and paragraph 17, Asao et al. disclose that the color light source driver 102 receives synchronization signals from the drive signal. The pixel data (i.e. display data of FIG. 19) is provided to the Y driver 92. The drive voltage, which is typically a reference voltage, is provided to the Y driver 92 and the X driver 91. The drive signal, which is a synchronization signal, is provided to the color light source driver 102, the Y driver 92, and the X driver 91. The scanning data is provided to the X driver 91.

In particular, with reference to paragraph 73, Asao et al. disclose that the entire backlight is uniformly illuminated at a first level during one sub-field period and that the entire backlight is uniformly illuminated at a second level during another subfield period. Accordingly, the backlight layer provides uniform output across the display, albeit at different intensity levels at temporally different times.

Zhang et al. disclose a liquid crystal display device comprising a backlight device 32, which contains N subsections of independently controllable color light pulse generation elements and a backlight driver 108. Zhang et al. disclose, as illustrated in FIG. 2, that each of the backlight sections are uniformly illuminated and each is illuminated to the same intensity level, albeit at temporally different times during a frame. Accordingly, in all cases, the illumination provided to the liquid crystal material has a non-zero uniform illumination.

Claim 1 patentably distinguishes over Asao et al. in view of Zhang et al. by claiming spatially varying the luminance of a light source illuminating a plurality of displayed pixels in response to a plurality of pixel values dependent on the content of an image to be displayed on the display and

wherein different regions of the light source are spatially displaced at the location to simultaneously provide different non-zero luminance.

In contrast, Asao et al. disclose a display system wherein the luminance provided by the backlight at any particular time is uniform. Moreover, Asao et al. does not include any mechanism to support simultaneous non-uniform backlight illumination.

In contrast, Zhang et al. disclose a display that has a spatially displaced light source that is either fully ‘on’ or fully ‘off’ depending on which sub-section is fully illuminated. Moreover, Zhang et al. fail to disclose simultaneous non-uniform backlight illumination.

There is no suggestion nor motivation in Asao et al. to modify their system in the claimed manner. Further, even if Asao et al. was modified in the manner suggested by the Examiner, it would still not include different regions of the light source having different simultaneous non-zero luminance. Also, even if Asao et al. was modified in the manner suggested by the Examiner, it would still not include illuminating a plurality of displayed pixels in response to a plurality of pixel values dependent on the content of an image to be displayed on the display. Moreover, Asao et al. fail to disclose illumination of the backlight based upon the pixel values.

Claims 3, 4, 6-9, 13-14, 27, 30, and 33 depend from claim 1, either directly or indirectly, and are patentable for the same reasons asserted for claim 1.

Claim 19 patentably distinguishes over Asao et al. in view of Zhang et al by claiming a light source controller to spatially modulate a luminance output of a light source element according to a relationship of the luminance output and the pixel value dependent on the content of an image to be displayed on the display of the image pixel and wherein different regions of the light source spatially displaced at the location simultaneously provide different non-zero luminance.

Claims 28, 31, and 34 depends from claim 19 and are patentable for the same reasons asserted for claim 19.

Claim 21 patentably distinguishes over Asao et al. in view of Zhang et al. by claiming the luminance levels based on pixel values dependent on the content of an image to be displayed on the display, wherein different regions of the light source spatially displaced at the location simultaneously provide different non-zero luminance.

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Claims 23, 24, 29, 32, and 35 depends from claim 21 and are patentable for the same reasons asserted for claim 21.

If the Examiner believes that for any reason direct contact with applicant's attorney would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the number below.

Respectfully submitted,

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